

## MYOSTATIN MANAGEMENT TOOLBOX

### What are Myostatin Genes?

There are 6 Disruptive Myostatin genes in cattle that are responsible for expressing more/extra muscle growth, (nt821) del 11, Q204X, nt419, E226X, C313Y, E291X) These Myostatin Genes are RECESSIVE genes and thus only come to their full expression and affect when an animal carries any 2 copies of the above mentioned genes.

An animal inherits 2 different genes; one from its mother and one from its father. "Recessive" means that if one Myostatin gene and one normal gene are present in the same animal, the Myostatin gene will be suppressed by the opposing dominant non-disruptive gene inherited from the other parent.

For example: When 1 Myostatin and 1 normal gene are passed on to a calf, the calf may show some extra muscling but will never show extreme muscling from having only 1 Myostatin gene. The normal gene will overpower the Myostatin gene and stop extreme muscle growth.

### Testing

*Can we test for the presence of Myostatin Genes? YES!*

*Can we test for the presence of 0(N), 1(C) or 2(A) copies of the gene? YES!*

*How can you test your Animal to find out if it has 0,1 or 2 copies of the Myostatin gene?*

1. Collect tail hair samples in the same way you would for DNA typing and parent verification. A small bundle of hair roots is all you need.(10-20)
2. Samples can be sent to either:
  - Elizabeth Macarthur Agricultural Institute, Department of Primary Industries, or
  - The University of Queensland, Animal Genetics Laboratory

### ***Elizabeth Macarthur Agricultural Institute, Department of Primary Industries:***

You will have to fill in the DPI Veterinary Laboratory Specimen Advice form and ask for "Myostatin" or "Double Muscling" tests to be done on the hair samples. These forms can be downloaded from the SPI website.

Send the samples to Elizabeth Macarthur Agricultural Institute, Department of Primary Industries, Private Mail Bag 4008, Narellan,NSW, 2567.

Phone: 02 4640 6474 Email: [emai.genetics@industry.nsw.gov.au](mailto:emai.genetics@industry.nsw.gov.au)

NOTE: If more than 30 samples are sent in one batch the DPI will give you a discounted price.

### ***The University of Queensland, Animal Genetics Laboratory:***

You will have to fill in the Cattle Genotyping Application form for UQ AGL and ask for MSTP (Myostatin Panel from Igenity (GeneSeek)). The form can be downloaded from the SPI website.

Send the samples to The University of Queensland, Animal Genetics Laboratory, Gatton QLD 4343.

Phone: 07 5460 1958 Email: [cattledna@uq.edu.au](mailto:cattledna@uq.edu.au)

### **How to read and use the results of the tests from the DPI?**

Tested animals will have one of the following 3 letters next to them:

1. "N" This is an animal that contains NO (0) copies of the Myostatin gene
2. "C" This is an animal that carries ONE (1) copy of the Myostatin gene.
3. "A" This is an animal that has TWO (2) copies of the Myostatin gene.

### **How to read and use the results of the MSTP test from the AGL?**

Tested animals will have 9 results, the most relevant result is for test NT821:

1. "I/I" This is an animal that contains NO (0) copies of the Myostatin gene (N)
2. "D/I or I/D" This is an animal that carries ONE (1) copy of the Myostatin gene. (C)
3. "D/D" This is an animal that has TWO (2) copies of the Myostatin gene. (A)

The results will be kept confidential and you can decide what to do with your results. The results will only be published if the Breeder gives written permission to the SPI office. Please note the results need to be a report from the laboratory.

### **What do these Animals look like?**

1. "N" looks like a normal animal.
2. "C" looks like a normal animal or slightly more muscular.
3. "A" is a Double Muscled animal with an abnormally large, wide and rounded rump and thighs with prominent creases between muscle groups. There is usually little fat covering and bones seem thinner.

### **What are the different outcomes when breeding with "N", "C" and "A"?**

1. *What happens if you breed an "N" animal to another "N" animal?*
  - 100% of the calves will be carrying "N". They are all free of the Myostatin gene
  - Because none are carrying the gene, they can't transfer the gene to their progeny.
  - No double muscled calves can come from this pairing.

2. *What do you get if you breed an "N" (0 copies) with a "C" (1 copy)?*
  - There is a 50% chance of getting "N" (no copies)
  - There is a 50% chance of getting "C" (1 copy, thus a carrier)
  - There is a 0% chance of getting "A" (a double muscled calf)
  - No double muscled calves can come from this pairing
  
3. *What do you get if you breed a "C" to a "C"?*
  - There is a 25% chance of getting an "A" (2 copies of the Myostatin gene) this calf will be double muscled.
  - There is a 25% chance of getting a "N" (no copies)
  - There is a 50% chance of getting a "C" (carrier of 1 copy)
  - This combination will result in 25% of calves being Double Muscled!
  
4. *What do you get if you breed a "C" to an "A"?*
  - There is a 50% chance for "A" (2 copies of the Myostatin gene) and thus double muscled.
  - A 50% chance for "C" (Carrier, 1 copy)
  - This combination will result in half of all calves being "A" /Double Muscled.

### **Myostatin, Help or Hinder?**

Teys Australia has recently announced a bold vision to reward cattle producers for the meat yield their cattle deliver. Payments based on actual meat yield will be made possible by the rapid advances in carcass x-ray technology that can provide a breakdown into red meat, bone and fat.

According to Scientific research, Myostatin genes have proven to increase carcass yield. Animals with one copy of the Myostatin gene ("C") offer superior muscling advantages over cattle without a Myostatin gene, including increased muscle mass, increased rib eye area (EMA) and a small reduction in fat.

While the double muscled ("A") form has bigger benefits for retail beef yield it can also lead to production disadvantages such as leanness (almost no fat cover and marbling), higher levels of assisted calvings, reduced fertility and longevity.

Care should thus be taken when selecting for and breeding with double muscled animals (2 Myostatin genes present). The use of the Myostatin genes in beef herds may be profitable but will need careful genetic monitoring with rigorous Myostatin Gene Testing.